UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,505	02/27/2007	Iichiro Inoue	1035-626	2374

7590 08/10/2011

Nixon & Vanderhye
901 North Glebe Road
11th Floor
Arlington, VA 22203-1808

EXAMINER	
MERLIN, JESSICA M	

ART UNIT	PAPER NUMBER
2871	

MAIL DATE	DELIVERY MODE
08/10/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,505	INOUE ET AL.	
	Examiner	Art Unit	
	JESSICA M. MERLIN	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23,25-28 and 31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23,25-28 and 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 April 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Receipt is acknowledged of applicant's amendment filed May 23, 2011. Claims 24, 29 and 30 have been cancelled without prejudice. Claims 1-23, 25-28 and 31 are pending and an action on the merits is as follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-6, 7, 9-12, 14-16 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al. (U.S. 6,266,109 B1) in view of Stephenson, III et al. (U.S. 2005/0253987 A1).

In regard to claim 1, Yamaguchi et al. discloses a display element, comprising *(see e.g. Figures 1-6a-b):*

a pair of substrates **201a,b** which are opposed to each other; and

a substance layer **204** sandwiched between the substrates **201a,b**,

the display element performing display operation by applying an electric field to between the substrates **201a,b** *(see e.g. Column 22, lines 45-47),*

the substance layer **204** including a liquid crystalline medium exhibiting a nematic liquid crystal phase *(Column 24, line 42)*, and exhibiting an optical isotropy when no electric field is

applied, while exhibiting an optical anisotropy when an electric field is applied *(see e.g. Column 22 lines 48-53 and Column 22 line 64-Column 23 line1)*,

and wherein the display element comprises first and second polarizers in crossed nichols orientation *(see e.g. Column 15, lines 29-47).*

Yamaguchi et al. fails to explicitly disclose

wherein:

$\Delta n \cdot |\Delta\varepsilon| \geq 1.9$,

where Δn is a refractive index anisotropy at 55Onm in a nematic phase of the liquid crystalline medium exhibiting the nematic liquid crystal phase, and $|\Delta\varepsilon|$ is an absolute value of a dielectric anisotropy at l kHz in the nematic phase of the liquid crystalline medium exhibiting the nematic liquid crystal phase, and

wherein the liquid crystal medium has a negative dielectric anisotropy.

However, Yamaguchi et al. does disclose $\Delta n \geq 0.2$ and $\Delta\varepsilon \geq 15$, which yields $\Delta n \cdot |\Delta\varepsilon| \geq 3$ *(see e.g. Column 5, lines 29-35)*, which overlaps applicant's claimed range. It is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists *(see e.g. MPEP 2144.05).*One of ordinary skill in the art at the time of the invention would recognize utilizing the above value, since it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al. with $\Delta n \cdot |\Delta\varepsilon| \geq 1.9$, where Δn is a refractive index anisotropy at 550 nm in a nematic phase of the liquid crystalline medium exhibiting the

nematic liquid crystal phase, and $|\Delta\varepsilon|$ is an absolute value of a dielectric anisotropy at 1 kHz in the nematic phase of the liquid crystalline medium exhibiting the nematic liquid crystal phase.

Doing so would provide a high Kerr effect and a lowering of the driving voltage of the display device *(see e.g. Column 5, lines 29-36 of Yamaguchi et al.).*

Yamaguchi et al. is silent as to the liquid crystal medium has a negative dielectric anisotropy.

However, Stephenson, III et al. discloses the liquid crystal medium has a negative dielectric anisotropy *(see e.g. paragraph [0053] where it is noted that liquid crystal with negative dielectric anisotropy may be used).*

Given the teachings of Stephenson, III et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al. with the liquid crystal medium has a negative dielectric anisotropy.

Doing so would provide an art recognized liquid crystal material that is suitable for the liquid crystal display device *(see e.g. paragraph [0053] of Stephenson III et al.).*

In regard to claim 2, Yamaguchi et al. discloses the above limitations, but fails to explicitly disclose $\Delta n \geq 0.14$ and $|\Delta\varepsilon| \geq 14$.

However, Yamaguchi et al. does disclose $\Delta n \geq 0.2$ and $\Delta\varepsilon \geq 15$, *(see e.g. Column 5, lines 29-35)*, which overlaps applicant's claimed range. It is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists *(see e.g. MPEP 2144.05).*One of ordinary skill in the art at the time of the invention would recognize utilizing the above value, since it has been held that where the general condition of a

claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al. with $\Delta n \geq 0.14$ and $|\Delta\varepsilon| \geq 14$.

Doing so would provide a high Kerr effect and a lowering of the driving voltage of the display device *(see e.g. Column 5, lines 29-36 of Yamaguchi et al.).*

In regard to claim 3, Yamaguchi et al. discloses the above limitations, but fails to explicitly disclose $\Delta n \cdot |\Delta\varepsilon| \geq 4.0$.

However, Yamaguchi et al. does disclose $\Delta n \geq 0.2$ and $\Delta\varepsilon \geq 15$, which yields $\Delta n \cdot |\Delta\varepsilon| \geq 3$ *(see e.g. Column 5, lines 29-35)*, which overlaps applicant's claimed range. It is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists *(see e.g. MPEP 2144.05).*One of ordinary skill in the art at the time of the invention would recognize utilizing the above value, since it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al. with $\Delta n \cdot |\Delta\varepsilon| \geq 4.0$.

Doing so would provide a high Kerr effect and a lowering of the driving voltage of the display device *(see e.g. Column 5, lines 29-36 of Yamaguchi et al.).*

In regard to claim 4, Yamaguchi et al. discloses the above limitations, but fails to explicitly disclose $\Delta n \geq 0.2$ and $|\Delta\varepsilon| \geq 20$.

However, Yamaguchi et al. does disclose $\Delta n \geq 0.2$ and $\Delta \varepsilon \geq 15$, *(see e.g. Column 5, lines 29-35)*, which overlaps applicant's claimed range. It is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists *(see e.g. MPEP 2144.05).* One of ordinary skill in the art at the time of the invention would recognize utilizing the above value, since it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al. with $\Delta n \geq 0.2$ and $|\Delta \varepsilon| \geq 20$.

Doing so would provide a high Kerr effect and a lowering of the driving voltage of the display device *(see e.g. Column 5, lines 29-36 of Yamaguchi et al.).*

In regard to claim 5, Yamaguchi et al. discloses the above limitations, but is silent as to $\Delta \varepsilon$ is negative.

However, Stephenson, III et al. discloses $\Delta \varepsilon$ is negative *(see e.g. paragraph [0053] where it is noted that liquid crystal with negative dielectric anisotropy may be used).*

Given the teachings of Stephenson III et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al. with $\Delta \varepsilon$ is negative.

Doing so would provide an art recognized liquid crystal material that is suitable for the liquid crystal display device *(see e.g. paragraph [0053] of Stephenson III et al.).*

In regard to claim 6, Yamaguchi et al. discloses an orientation auxiliary material is provided between the substrates, the orientation auxiliary material functioning to promote

exhibition of an optical anisotropy by application of the electric field *(see e.g. Column 6, lines 56-64).*

In regard to claim 7, Yamaguchi et al. discloses the orientation auxiliary material is formed in the substance layer *(see e.g. Column 6, lines 56-64).*

In regard to claim 9, Yamaguchi et al. discloses the orientation auxiliary material is formed in a state where the liquid crystalline medium in the substance layer is in a liquid crystal phase *(see e.g. Column 24, lines 50-57).*

In regard to claim 10, Yamaguchi et al. discloses the orientation auxiliary material is made of a polymerizable compound *(see e.g. Column 24, lines 42-58).*

In regard to claim 11, Yamaguchi et al. discloses the orientation auxiliary material is made of a polymer compound *(see e.g. Column 24, lines 42-58).*

In regard to claim 12, Yamaguchi et al. discloses the orientation auxiliary material is made of at least one polymer compound selected from the group consisting of a chain polymer compound, a network polymer compound, and a cyclic polymer compound *(see e.g. Column 6, lines 60-62).*

In regard to claim 14, Yamaguchi et al. discloses the orientation auxiliary material is made of porous material *(see e.g. Column 6, lines 50-55).*

In regard to claim 15, Yamaguchi et al. discloses the orientation auxiliary material divides the liquid crystalline medium in the substance layer into small regions *(see e.g. Column 6, lines 44-55).*

In regard to claim 16, Yamaguchi et al. discloses the small region has a size of not more than a visible light wavelength *(see e.g. Column 9, lines 51-55).*

In regard to claim 31, Yamaguchi et al. discloses a display device including the display element according to claim 1 *(see e.g. Figures 6a-b).*

4. Claims 8, 13, 17-19, 23 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al. (U.S. 6,266,109 B1) in view of Stephenson, III et al. (U.S. 2005/0253987 A1) and further in view of Crawford (U.S. 5,956,113).

In regard to claim 8, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the orientation auxiliary material has a structural anisotropy.

However, Crawford discloses the orientation auxiliary material has a structural anisotropy *(see e.g. Column 3, lines 26-28).*

Given the teachings of Crawford, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the orientation auxiliary material has a structural anisotropy.

Doing so would provide an improved viewing angle by avoiding a lower potential haze and opaqueness that occurs with the use of isotropic polymers *(see e.g. Column 4, lines 7-10 of Crawford).*

In regard to claim 13, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the orientation auxiliary material is made of hydrogen bonding material.

However, Crawford discloses the orientation auxiliary material is made of hydrogen bonding material *(see e.g. Column 6, lines 42-44).*

Given the teachings of Crawford, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the orientation auxiliary material is made of hydrogen bonding material.

Doing so would provide a means for maintaining a bistable even upon removal of an electric field *(see e.g. Column 6, lines 47-50 of Crawford).*

In regard to claim 17, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the orientation auxiliary material is a horizontal alignment film which is provided in at least one of the substrates.

However, Crawford discloses the orientation auxiliary material is a horizontal alignment film which is provided in at least one of the substrates *(see e.g. Column 3, lines 22-24).*

Given the teachings of Crawford, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the orientation auxiliary material is a horizontal alignment film which is provided in at least one of the substrates.

Doing so would provide a display cell with a homogenous alignment under the applied field, which results in a more even liquid crystal molecule alignment and thus a higher quality display.

In regard to clam 18, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the horizontal alignment film is subjected to rubbing treatment or light irradiation treatment.

However, Crawford discloses the horizontal alignment film is subjected to rubbing treatment or light irradiation treatment *(see e.g. Column 3, lines 22-24).*

Given the teachings of Crawford, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the horizontal alignment film is subjected to rubbing treatment or light irradiation treatment.

Doing so would provide a display cell with a homogenous alignment under the applied field, which results in a more even liquid crystal molecule alignment and thus a higher quality display.

In regard to claim 19, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the horizontal alignment film is provided in each of the substrates, and is arranged so that rubbing directions in the rubbing treatment or light irradiation directions in the light irradiation treatment are parallel or antiparallel to each other.

However, Crawford discloses the horizontal alignment film is provided in each of the substrates, and is arranged so that rubbing directions in the rubbing treatment or light irradiation directions in the light irradiation treatment are parallel or antiparallel to each other (*see e.g. Figure 2b, 3b).*

Given the teachings of Crawford, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the horizontal alignment film is provided in each of the substrates, and is arranged so that rubbing directions in the rubbing treatment or light irradiation directions in the light irradiation treatment are parallel or antiparallel to each other.

Doing so would provide a display cell with a homogenous alignment under the applied field, which results in a more even liquid crystal molecule alignment and thus a higher quality display.

In regard to claim 23, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the substance layer further includes particulates sealed therein.

However, Crawford discloses the substance layer further includes particulates sealed therein *(see e.g. Column 6, lines 58-61).*

Given the teachings of Crawford, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the substance layer further includes particulates sealed therein.

Doing so would provide a means for maintaining a bistable even upon removal of an electric field *(see e.g. Column 6, lines 47-50 of Crawford).*

In regard to claim 27, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the substance layer has sealed therein a medium exhibiting chirality.

However, Crawford discloses the substance layer has sealed therein a medium exhibiting chirality *(see e.g. Column 5, lines 55-57).*

Given the teachings of Crawford, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the substance layer has sealed therein a medium exhibiting chirality.

Doing so would provide a display that has reduced power consumption due to the non-volatile memory characteristic of chiral nematic materials.

5. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al. (U.S. 6,266,109 B1) in view of Stephenson, III et al. (U.S. 2005/0253987 A1) in view of Crawford (U.S. 5,956,113) and further in view of Yoshida et al. (U.S. 2002/0047968 A1).

In regard to claim 20, Yamaguchi et al., in view of Stephenson, III et al. and Crawford, discloses the above limitations, but is silent as to said display element satisfies $\lambda/4 \leq \Delta n \times d \leq 3\lambda/4$ where d (μm) is a thickness of the substance layer, and λ (nm) is a wavelength of incident light.

However, Yoshida et al. discloses the liquid crystal layer has retardation (*i.e.* $\Delta n \times d$) is about $\lambda/2$ of green (*i.e.* middle of visible spectrum) *(see e.g. paragraph [0046])*, which overlaps applicant's claimed range. It is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists *(see e.g. MPEP 2144.05).*One of ordinary skill in the art at the time of the invention would recognize utilizing the above value, since it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

Given the teachings of Yoshida et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al. and Crawford, with said display element satisfies $\lambda/4 \leq \Delta n \times d \leq 3\lambda/4$ where d (μm) is a thickness of the substance layer, and λ (nm) is a wavelength of incident light.

Doing so would provide a maximized brightness of the display device by setting the retardation of the layer to half the wavelength corresponding to the highest human eye's color sensitivity *(see e.g. paragraph [0046] of Yoshida et al.).*

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al. (U.S. 6,266,109 B1) in view of Stephenson, III et al. (U.S. 2005/0253987 A1) in view of Crawford (U.S. 5,956,113) and further in view of Huang et al. (U.S. 7,079,203 B1).

In regard to claim 21, Yamaguchi et al., in view of Stephenson, III et al. and Crawford, discloses the above limitations, but is silent as to the horizontal alignment film is provided in each of the substrates, and is arranged so that rubbing directions in the rubbing treatment or light irradiation directions in the light irradiation treatment are orthogonal to each other.

However, Huang et al. discloses the horizontal alignment film is provided in each of the substrates, and is arranged so that rubbing directions in the rubbing treatment or light irradiation directions in the light irradiation treatment are orthogonal to each other *(see e.g. Column 6, lines 3-14).*

Given the teachings of Huang et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al. and Crawford, with the horizontal alignment film is provided in each of the substrates, and is arranged so that rubbing directions in the rubbing treatment or light irradiation directions in the light irradiation treatment are orthogonal to each other.

Doing so would provide a commonly known and recognized orientation of a twisted nematic liquid crystal.

7. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al. (U.S. 6,266,109 B1) in view of Stephenson, III et al. (U.S. 2005/0253987 A1) in view of Crawford (U.S. 5,956,113) in view of Huang et al. (U.S. 7,079,203 B1) and further in view of Shimoshikiryo (U.S. 2001/0033353 A1).

In regard to claim 22, Yamaguchi et al., in view of Stephenson, III et al., Crawford and Huang et al., discloses the above limitations, but is silent as to said display element satisfies 350 (nm) $\leq \Delta n \times d \leq 650$ (nm) where d (μm) is a thickness of the substance layer.

However, Shimoshikiryo discloses a liquid crystal layer with a retardation in the range of 100-500 nm *(see e.g. paragraph [0120])*, which overlaps applicant's claimed range. It is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists *(see e.g. MPEP 2144.05).*One of ordinary skill in the art at the time of the invention would recognize utilizing the above value, since it has been held that where the general condition of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

Given the teachings of Shimoshikiryo, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., Crawford and Huang et al., with said display element satisfies 350 (nm) $\leq \Delta n \times d \leq 650$ (nm) where d (μm) is a thickness of the substance layer.

Doing so would provide a typical value of birefringence and thickness of a liquid crystal cell in typical operating modes that is well known in the art.

8. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al. (U.S. 6,266,109 B1) in view of Stephenson, III et al. (U.S. 2005/0253987 A1) and further in view of Crawford et al. (U.S. 6,778,236 B1), hereinafter Crawford et al. '236.

In regard to claim 25, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the substance layer has sealed therein a medium containing polar molecules.

However, Crawford et al. '236 discloses the substance layer has sealed therein a medium containing polar molecules *(see e.g. Column 4, lines 44-49 and 63-65).*

Given the teachings of Crawford et al. '236, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the substance layer has sealed therein a medium containing polar molecules.

Doing so would provide an orienting molecule that promotes orientation of liquid crystal droplets within the substance layer.

9. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al. (U.S. 6,266,109 B1) in view of Stephenson, III et al. (U.S. 2005/0253987 A1) and further in view of Khan et al. (U.S. 7,009,666 B2).

In regard to claim 26, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the substance layer takes a twisted structure with only one chirality.

However, Khan et al. discloses the substance layer takes a twisted structure with only one chirality *(see e.g. Column 3, lines 53-59 where it is noted that the chiral nematic layer may have either a left handed or right handed chirality).*

Given the teachings of Khan et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the substance layer takes a twisted structure with only one chirality.

Doing so would provide a liquid crystal display that selectively transmits or reflects based on the polarization of incident light.

10. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al. (U.S. 6,266,109 B1) in view of Stephenson, III et al. (U.S. 2005/0253987 A1) and further in view of Sugimoto et al. (U.S. 6,524,759 B1).

In regard to claim 28, Yamaguchi et al., in view of Stephenson, III et al., discloses the above limitations, but is silent as to the liquid crystalline medium has a selective reflection wavelength band or a helical pitch of not more than 400 nm.

However, Sugimoto et al. discloses the liquid crystalline medium has a selective reflection wavelength band that may fall within the UV range *(see e.g. Column 11, lines 14-19),* which overlaps applicant's claimed range. It is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists *(see e.g. MPEP 2144.05).*One of ordinary skill in the art at the time of the invention would recognize utilizing the above value, since it has been held that where the general condition of a

claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

Given the teachings of Sugimoto et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the display device of Yamaguchi et al., in view of Stephenson, III et al., with the liquid crystalline medium has a selective reflection wavelength band or a helical pitch of not more than 400 nm.

Doing so would provide a display that reflects a particular wavelength of light that is may be chosen based upon the purpose of the display device.

Response to Arguments

11. Applicant's arguments with respect to claims 1-23, 25-28 and 31 have been considered but are moot in view of the new ground(s) of rejection.

12. In regard to independent claim 1, applicant's arguments, on pages 8-9 of the Remarks, that the previously applied prior art fails to disclose all of the limitations of claim 1, as newly amended, have been fully considered and are appreciated. However, the examiner respectfully disagrees.

13. First, applicant argues that Yamaguchi fails to disclose the newly added limitation, "wherein the liquid crystal medium has a negative dielectric anisotropy, and wherein the display element comprises first and second polarizers in crossed Nichols orientation." However, as cited above, Yamaguchi discloses "wherein the display element comprises first and second polarizers in crossed Nichols orientation," but is silent as to "wherein the liquid crystal medium has a negative dielectric anisotropy." Stephenson, III et al. discloses the liquid crystal medium has a

negative dielectric anisotropy *(see e.g. paragraph [0053] where it is noted that liquid crystal with negative dielectric anisotropy may be used).* The motivation for combining Yamaguchi with Stephenson, III et al., is to provide an art recognized liquid crystal material that is suitable for the liquid crystal display device *(see e.g. paragraph [0053] of Stephenson III et al.).*

14. Second, applicant argues that Yamaguchi does not disclose the technical idea of multiplying Δn by $|\Delta\varepsilon|$. However, Yamaguchi et al. does disclose $\Delta n \geq 0.2$ and $\Delta\varepsilon \geq 15$, *(see e.g. Column 5, lines 29-35)*, which overlaps applicant's claimed range for $\Delta n \cdot |\Delta\varepsilon| \geq 3$. It is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists *(see e.g. MPEP 2144.05).*

15. Finally, applicant argues that the negative dielectric anisotropic material of Stephenson, III et al., may not be combined with Yamaguchi. However, the examiner respectfully disagrees. Namely, one of ordinary skill in the art would recognize the use of a negative dielectric anisotropic liquid crystal display as an art recognized equivalent, as it is well known in the art that positive or negative dielectric anisotropic liquid crystals may be used within display devices.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSICA M. MERLIN whose telephone number is (571)270-3207. The examiner can normally be reached on Monday-Friday 6:30AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jessica M. Merlin
August 9, 2011

/JESSICA M MERLIN/
Primary Examiner, Art Unit 2871